

REMARKS

By the present amendment, independent claims 3, 7, 9 and 10 have been amended to obviate the examiner's objections thereto and/or to further clarify the concepts of the present invention. In addition, claims 11-18 have been added. Support for the subject matter of newly added claims 11, 13, 15, and 17 can be found at the paragraph starting from page 12, line 26 to page 13, line 2 of the subject specification. Support for the subject matter of newly added claims 12, 14, 16, and 18 can be found on the paragraphs starting from page 8, line 9 to line 15, from page 11, line 19 to page 12 line 5, from page 13, line 14 to line 18, and from page 14, line 18 to line 25 of the subject specification. It is submitted that no new matter has been added by these claims. Thus, claims 1-18 remain pending with claims 1 and 2 withdrawn from consideration. Entry of these amendments is believed to be in order and such is respectfully requested.

In the Action, claims 3 and 9 were rejected under the second paragraph of 35 USC § 112 as being indefinite. In particular, it was alleged that certain terms did not have proper antecedent basis. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

In response, these two claims have been amended to adopt the suggestions contained in the Action. Accordingly, withdrawal of the rejection under 35 U.S.C. § 112 is respectfully requested.

Claims 1-4 and 7-10 were rejected under 35 USC § 103(a) as being unpatentable over the newly applied patent to Kuroi et al in view of the previously cited patent to Krivokapic et al. In making this rejection, it was asserted that the Kuroi et al patent teaches the method as claimed except for depositing the oxide insulation in the trenches by performing HDPCVD. The Krivokapic et al patent was then asserted to teach forming an insulating oxide layer in a trench using HDPCVD. It was concluded that it would be obvious to use HDPCVD in the method of the Kuroi et al patent since the Krivokapic et al patent teaches HDPCVD is self-planarizing and thus facilitates subsequent production steps. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

It is submitted that the patents to Kuroi et al and Krivokapic et al, whether taken singly or in combination, do not teach or suggest the methods as presently claimed. More particularly, the Kuroi et al patent does not teach or suggest, among other things, the feature of the present invention of "etching the insulation deposited in the mask aligning trench to remove some of the insulation while covering the insulation deposited in the

element partitioning trench by the protective mask so that the insulation deposited in the mask aligning trench has an upper surface located lower than the upper surface of the semiconductor substrate, prior to removing the protective mask."

As shown in Fig. 3d of the subject application, the insulation layer 51a deposited in the mask aligning trench 50 has an upper surface located lower than the upper surface of the semiconductor substrate 1, prior to removing the protective mask 15. In the claimed invention, etching the insulation layer 51a is performed prior to removing the protective mask 15 and forms a step (an alignment step) between the upper surface of the insulation layer 51a and the upper surface of the semiconductor substrate 1. According to the claimed methods, the insulation layer 51a deposited in the mask aligning trench 50 is selectively etched during said etching, but the insulation in the element partitioning trench 40 is not etched due to the protective mask 15. Accordingly, it is easy to adjust height of the alignment step as needed. In other words, it is efficient to form a large (deep) alignment step by performing the etching, such as by a magnetron RIE. This large alignment step can improve mask alignment accuracy.

In distinct contrast to the presently claimed invention, Figs. 4, 12, 28, and 43 of the Kuroi et al patent show that an upper surface of insulation 2 in alignment trench 10A is located at the same level as the upper surface of the semiconductor substrate 1, prior to removing the resist (protective mask) 5 or 51. In particular, Fig. 3 of the Kuroi et al patent

shows that silicon oxide film 2 is deposited so that the upper surface of the silicon oxide film on the alignment trench 10A is at the same level as the upper surface of silicon nitride film 4. Further, Fig. 4 shows that silicon oxide film 2 is dry etched so that the upper surface of the silicon oxide film on the alignment trench 10A is at the same level of the upper surface of the semiconductor substrate 1. After that, CMP is performed to form an alignment step in trench 10A as shown in Fig. 5.

Therefore, the Kuroi et al patent teaches that an alignment step is formed by performing CMP. As is known, CMP requires a long processing time for forming a large or deep alignment step. Such a long processing time for CMP may remove, not only the silicon oxide film 2 in the trench 10A, but also some of the upper surface of the semiconductor substrate 1. Therefore, it is inefficient to adjust the height of the alignment step by performing CMP.

It is submitted that the above teaching deficiencies of the Kuroi et al patent are not supplied by the Krivokapic et al patent. More particularly, the Krivokapic et al patent merely discloses depositing insulation by HPDCVD. However, the Krivokapic et al patent does not teach or suggest the feature of the claimed invention of "etching the insulation deposited in the mask aligning trench to remove some of the insulation while covering the insulation deposited in the element partitioning trench by the protective mask so that the insulation deposited in the mask aligning trench has an upper surface located lower than the upper

surface of the semiconductor substrate, prior to removing the protective mask." Therefore, it is submitted the presently claimed invention is not taught by the patent to Krivokapic et al alone or in combination with the patent to Kuroi et al.

As for the subject matter of newly added dependent claims 11-18, it is submitted that the Kuroi et al and Krivokapic et al patents, whether taken singly or in combination, do not teach or suggest the features set forth therein. In particular, the Kuroi et al and Krivokapic et al patents do not teach or suggest, among other things, adjusting the height of the step at the time of removing the film to a predetermined height that is equal to a depth etched during subsequent processes including the patterning of the conductive film.

For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 3-4 and 7-18 as amended over the cited patents are respectfully requested.

Claims 5 and 6 were rejected under 35 USC § 103(a) as being unpatentable over the above patents to Kuroi et al and Krivokapic et al in view of the patent to Schoenfeld et al. The former two patents were applied as in the previous rejection and the latter patent was asserted to supply the teaching deficiency of these two patents with respect to the use of rotary grinding in a CMP process. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

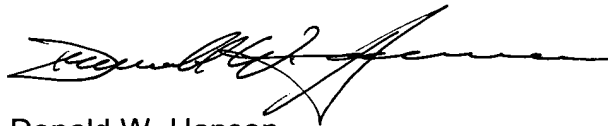
The above remarks relative to the teaching deficiencies of the Kuroi et al and Krivokapic et al patents are reiterated with regard to this rejection. It is submitted that the patent to Schoenfeld et al does not supply these teaching deficiencies. Thus, it is submitted that the distinctions as developed above with respect to the initial rejection are applicable to this rejection as well. Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 5 and 6 over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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